

1.2 Exponents and Powers

$$2^5 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

Diagram illustrating the components of the expression 2^5 and its expanded form:

- The **Base** is the number 2.
- The **Exponent** is the number 5.
- The expanded form shows 5 factors of 2 multiplied together.

*Note: the expression 2^5 is a power

EXPONENTIAL FORM	WORDS	MEANING
a. 10^1	ten to the first power	10
b. 4^2	four to the second power, or four squared	$4 \cdot 4 = 16$
c. 5^3	five to the third power, or five cubed	$5 \cdot 5 \cdot 5 = 125$
d. 7^6	seven to the sixth power	$7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7$
e. x^n	x to the n th power	$x \cdot x \cdot \dots \cdot x$
.....		

For a number raised to the first power, you usually do not write the exponent 1.
For instance, you write 5^1 simply as 5.

Order of Operations

Left to Right

P
A
R
E
N
T
H
E
S
I
S

E
X
P
O
N
E
N
T
S

R
A
D
I
C
A
L
S

M
U
L
T
I
P
L
I
C
A
T
I
O
N

D
I
V
I
S
I
O
N

A
D
D
I
T
I
O
N

S
U
B
T
R
A
C
T
I
O
N

Ex 1: Evaluate x^3 when $x = 2$

$$2^3 = 2 \cdot 2 \cdot 2 = 8$$

Ex 2: Evaluate $2x^3$ and $(2x)^3$ when $x = 3$

$$\begin{aligned} &2 \cdot 3^3 \\ &= 2 \cdot 27 \\ &= \boxed{54} \end{aligned}$$

$$\begin{aligned} &(2 \cdot 3)^3 \\ &= 6^3 = \boxed{216} \end{aligned}$$

Ex 3: Evaluate

$$x - y^2 \div 4$$

when $x = 3$ and $y = 2$

$$3 - 2^2 \div 4$$

$$= 3 - 4 \div 4$$

$$= 3 - 1$$

$$= \boxed{2}$$

Ex 4:

ART

CONNECTION

In 1997 the artist Jon Kuhn of North Carolina created a cubic sculpture called Crystal Victory, shown at the left. Each edge of the solid glass cube is 9.5 inches in length. How much liquid glass did Kuhn need to make the cube?



$$V = s^3$$

$$= 9.5^3$$

$$= 9.5 \cdot 9.5 \cdot 9.5$$

$$= \boxed{857.375 \text{ in}^3}$$

Homework: p.12-13 #16, 27-59 odd